

**Determinants of Land Finance in China:
A Study Based on Provincial-level Panel Data**

Fangzhi Ye

PhD candidate

Department of Public and Social Administration

City University of Hong Kong

Tat Chee Avenue, Kowloon, Hong Kong

yefangzhi@hotmail.com, Tel: 852-6743-4799

Wen Wang

Assistant Professor

Department of Public and Social Administration

City University of Hong Kong

Tat Chee Avenue, Kowloon, Hong Kong

wenwang@gmail.com, Tel: 852-3442-8273

Determinants of Land Finance in China: A Study Based on Provincial-level Panel Data

Abstract:

Tapping land values to raise extra-budgetary funds for local coffers has been a prominent fiscal phenomenon in many developing countries. This article, based on a provincial-level panel dataset for the period 1999-2009, examines the factors behind Chinese local governments' reliance on land finance. Our analysis shows that intergovernmental fiscal arrangements, such as the central-provincial fiscal imbalance, and the lack of adequate revenue capacity of sub-provincial governments, have encouraged local governments to exploit land leasing. There is also evidence suggesting that political factors might have a significant impact on land finance arrangements, but these tentative results need further investigation. This research contributes to the body of literature on intergovernmental fiscal relations, and improves our understanding of the dynamics and complexity of land finance arrangements in China. Policy implications are drawn from this analysis for further reforms of land management and intergovernmental financing in China and other developing countries facing similar challenges.

Key Words: Land finance, intergovernmental fiscal relations, extra-budgetary funds, fiscal imbalance, developing countries

Determinants of Land Finance in China: A Study Based on Provincial-level Panel Data

Introduction

Countries with multi-level governments often face challenges of intergovernmental fiscal relations of a principal-agent nature (Van Houten 2009). The central government, as the principal, may delegate responsibility to local agents for the management of certain functions to ensure efficient implementation and responsiveness to the needs and preferences of the local population. At the same time, for fiscal integrity and accountability, the center commonly places either statutory or constitutional constraints, such as balanced budget requirements, to limit local agents' spending or indebtedness (Bohn and Inman 1996). The constraints on government spending and borrowing weaken local politicians' capacity to channel benefits to the public and particularly to their supporters. In response to these fiscal constraints, however, local politicians may seek to devise various means to move government activities "off the budget" or "underground" (Bennett 2003). Allen and Radev (2006) note that, extra-budgetary funds (EBFs), an umbrella concept that includes all revenue, expenditure, and financing that are outside the control of budgetary rules and procedures, have been a major component of local government financing particularly in developing countries.¹ On average, in 2005, the amount of EBFs accounted for 3.1% of national GDP in both developed and developing countries (Allen and Radev 2006, p.11).

Much of the analysis of EBFs to date has focused on their aggregate impact on

government finances and the economy, and on measures to deal with the resulting problems (Kraan 2004; Potter and Diamond 1999). Scant attention has been devoted to examining the determinants of EBFs (Bennett and DiLorenzo 1982; Marlow and Joulfaian 1989; Merrifield 1994). In particular, we have little knowledge about this issue in developing and transition countries. Uncertainty about the determinants of EBFs may lead to misunderstanding of their causes, and inappropriate measures to address the problems EBFs often cause. This research aims to fill this important niche by examining the determinants of one important category of EBFs in local China, that is, land conveyance fees (*tudi churangjin*), or land leasing revenue.

One of the most prominent fiscal phenomena in China in recent years has been the heavy reliance of local governments on land conveyance fees. This phenomenon has been dubbed as “land finance.”² In 1998, revenues from sales of land leases were classified as an identifiable category of extra-budgetary fund that must be included in budget reports to the People’s Congress, but the management of the revenue has still been loose compared to that of formal budgetary revenue (Wong and Bird 2008).

Land finance, in many cases, represents a positive opportunity for local governments. Not only can land leasing generate substantial amounts of revenue, but also the use of surplus land for infrastructure can contribute to urban growth in an economically efficient manner (Peterson 2009). However, the heavy dependence on land finance among local governments in China has raised great public concerns and attracted much attention for a number of reasons. First, given the fact that land is a finite asset, the capital value of fees for the rights to lease land is not a source of

ongoing stable funds to meet growing expenditure commitments: the land conveyance fee is in many respects a windfall of revenue, or a once-only capital gain, for local governments (Lin and Ho 2005). The current practice of relying on land finance to fund capital project can hardly be stable or sustainable in the long run. Second, such land finance effectively takes resources and social wealth from the future for the current generation by collecting the one-off land conveyance fee in respect of the following 40 to 70 years, resulting in inter-generational inequity. Third, since land prices are extremely volatile, revenue dependence on land leasing and reliance on land and property values as the collateral for borrowing can result in a threat to overall fiscal stability should there be a decline or bubble burst in the real estate market (Peterson 2006). Fourth, the rapid pace of land conversion from agricultural to non-agricultural use has been threatening China's food security and could not go on for an extended period of time (Lichtenberg and Ding 2008). Last but not least, large-scale land leasing has also provided opportunities for corruption and has been at the centre of thousands of social unrests across China because of lack of consultation and appropriate compensation, posing a challenge to the legitimacy of the Chinese government (Guo 1997; Nitikin, Shen, Wang and Zou 2012). In order to better understand the dynamics of current land finance arrangements, and to suggest solutions to the problems associated with them, we develop a model to examine the factors behind Chinese local governments' heavy dependence on land finance, using a provincial-level panel dataset for the period 1999-2009.

The empirical results of this study suggest that the central-provincial fiscal

relations and the fiscal arrangements between provincial governments and sub-provincial governments do influence land finance dependency. There is also evidence that suggests political factors might have a significant effect, though these results need further investigation for confirmation.

The rest of this paper is organized into five sections. The next section describes historical developments and the current practice of land finance. The third section reviews related literature, and is followed by a description of the data, model, hypotheses, and estimation methods in the fourth section. The results from the research and a discussion are presented in the fifth section. The last section sets out our conclusions and points out the implications of this research.

Land Finance in China

From 1954 to 1978, land in socialist China was allocated entirely to users under administrative plans without any charges (Lin and Ho 2005; Yeh and Wu 1996). Since the introduction of economic reforms and a more open door policy from the late 1970s, the Chinese government has initiated a series of reforms to accommodate the demands from foreign and overseas Chinese businesses for the clarification of land use rights and land property rights (Zhu 2005). In 1986, China's first *Land Administration Law* was enacted. It legally confirmed a split land ownership system in which the state owns all land in urban areas and rural collectives own land in rural areas. In 1987, Shenzhen, a city in Guangdong Province at the vanguard of reforms, initiated a significant land reform. It separated the rights of ownership from the rights

of use of urban state-owned land, keeping the state ownership unchanged, but conveying the urban land use right from the state to industrial and commercial developers for a period of 40-70 years (Yeh and Wu 1996). This new practice generated a huge amount of land leasing revenue, or ‘land conveyance fees’, for the Shenzhen government. In 1988, China’s *Constitution* was amended, allowing the separation of land use rights from land ownership and the lease of land use rights in an open market (Li 2003). This new regime has provided sub-national governments, the *de facto* representatives of the state in land administration, with an unprecedented lucrative opportunity from the emerging land market. For rural land, the property right is collectively owned by peasants. According to the *Land Administration Law*, such property can be expropriated by the state “in the public interest”; the former peasant owners are entitled to compensation, but this is usually far below the revenue received by sub-national governments when they lease the land to commercial users (Yep and Fong 2009). Thus, China’s split land ownership system and land use regulations have resulted in a substantial price difference between the urban and rural sectors, generating an opportunity for governments to access a new fiscal revenue stream.

The sharing of the land conveyance fees between the central and sub-national governments is reflected in changes in intergovernmental fiscal relations. In the late 1980s, sub-national governments’ share of land conveyance fee was set at 40%, which discouraged local governments from getting involved in land development. This share was increased to 68% in 1989, and raised again to 95% in 1992 (Peterson 2009).

When the recentralization-oriented tax-sharing system (*fenshuizhi*) reform was

launched by the central government in 1994, the centre permitted sub-national governments to keep the entire land conveyance fee as an extra-budgetary revenue base. Even though the Chinese central government classified it as an identifiable category of extra-budgetary funds in 1998, as a first step toward incorporating it into budgetary revenues (Wong and Bird 2008), and attempted to impose more stringent measures on its collection and usage in 2007,³ local governments still have considerable discretion over how it is raised and administered and substantial flexibility in the way it is used, with relative immunity from the watchful eyes of local People's Congress as well as higher levels of government. Local officials often use land conveyance fees as a convenient revenue source for infrastructure construction and other pro-development activities that help their own careers and political ambitions (Cao and Zhao 2011).

Land conveyance fees have become a significant component of Chinese local coffers over the past decade. According to data from *China Land and Resource Almanac*, in 1999, the total amount of land conveyance fees was about CNY 51.4 billion (USD 642 million), just over 9% of total sub-national budgetary revenue (CNY 558 billion). In 2011, land conveyance fees amounted to CNY 3.15 trillion (approximately USD 484.6 billion), or just over 60% of total sub-national budgetary revenue.

Literature Review

The literature often uses three categories of factors - fiscal, political, and

socioeconomic - to explain the determinants of public finance phenomena (Avellaneda 2009). With regard to the determinants of extra-budgetary funds (EBFs), Allen and Radev (2006) provide a theoretical framework for analysis, consisting of two main groups of factors: a series of “market” or budgetary system failures and political economy factors. Some empirical research (Bennett and Dilorenzo 1982; Marlow and Joulfaian 1989) based on state-level data in the U.S. has revealed that a state’s revenue structure may exert a significant impact on EBFs, which offer the opportunity to substitute for or supplement budgetary revenues. Political factors, such as the strength of a governor’s veto power, the length of legislative terms of office and number of legislators, may have a negative impact on EBFs (Merrifield 1994).

The theoretical frameworks and empirical research developed in the context of western democracies provide some guidance for us to examine the determinants of land finance, an important EBF in China. But China’s unique authoritarian political system and its transitional economy may lead to distinctive explanations. We attempt to examine the determinants of Chinese local governments’ heavy reliance on land finance from two perspectives: 1) intergovernmental fiscal relations, and 2) political incentives. The main arguments are briefly presented as follows.

According to a report released by the World Bank, in the post-Mao era, China has been one of the most decentralized countries in the world in terms of the expenditure assignments allocated to local governments (Wong and Bird 2008). The expenditures assigned to local governments are often huge in comparison to international norms. Chinese local governments are overburdened with expenditure

assignments with limited budgetary revenues. Furthermore, Wong and Bird (2008) argue that “the most critical fiscal issue in China today essentially arises from the mismatch of expenditures and revenue between different layers of governments from the 1994 tax-sharing system reform and the resulting distortions as China’s various layers of government struggled to find their fiscal feet in this fundamentally distorted structure” (p.13). Consequently, in response to the centralization of budgetary revenue, local governments turned their attention to other means to raise revenue outside the budgetary system, such as from their land assets (Peterson 2009; Cao, Feng and Tao 2008).

Political factors are also known to influence fiscal outcomes at the subnational level (Alt and Lowry 1994; Bastida, Benito, and Guillamón 2009). Under China’s authoritarian personnel management system, the central government holds power over the selection and appointment of local officials (Chan 2004). The shift to a cadre evaluation and promotion system mainly based on economic performance in the reform era has created an incentive for local leaders to promote economic development in order for enhancing their prospects for promotion (Chan 2004; Guo 2009; Li and Zhou 2005). Land finance has become a convenient source of extra-budgetary revenue that can be used for infrastructure construction and other pro-development activities. Some scholars argue that land finance might be correlated with a leader’s length of time in office and age (Liu, Wu and Ma 2012). The longer a local leader is in office, the more likely for him to mobilize land finance to pursue development projects. Also, younger leaders with greater prospects

of promotion before reaching retirement age may be more eager to use land finance for promoting local development than older leaders.

Model, Hypotheses, Data, and Methodology

Dependent Variable

The dependent variable in this analysis is the degree of local governments' reliance on land finance in a province.⁴ It is measured as the ratio of total land conveyance fee to the total budgetary revenue of sub-provincial governments in a province. This reflects the facts that land conveyance fees are under the direct control of sub-provincial governments (i.e. cities, counties, and townships) and provincial governments are not involved in land conveyance activities. Thus, to measure the degree of reliance of local governments in a province upon land finance, the denominator of the ratio should be the total budgetary revenue of sub-provincial governments in a province, excluding the budgetary revenue of the provincial government itself.

Explanatory Variables and Hypotheses

Our explanatory variables comprise a number of fiscal, political, socioeconomic, demographic, and geographic factors. We explore the relationship between the following key variables and the dependent variable, and test a number of related hypotheses.

- (1) ***Transfer dependency.*** This refers to the extent to which a province's budgetary expenditure is funded by transfers from the central government.

The numerator of this variable is central transfers to a province, including

those for provincial, prefectural, county and township levels of government in that province, while the denominator refers to budgetary spending by all of the four tiers of government within a province in China. It measures the gap between the self-raised revenues of all tiers of government within a province and their expenditure assignments (Wu and Wang 2013).

H_1 : Local governments tend to rely more on land finance if they are located in a province with a greater transfer dependency on the central government.

(2) ***Revenue decentralization.*** This is measured as the share of sub-provincial budgetary revenue in total provincial and sub-provincial budgetary revenue. It is calculated by summing up prefectural, county and township budgetary revenue first, and then dividing it by total provincial and sub-provincial budgetary revenue in a given province. To some extent, revenue decentralization also measures sub-provincial governments' budgetary fiscal capacity within a province.

H_2 : Local governments tend to rely more on land finance if they are located in a province with lower revenue decentralization.

(3) ***Expenditure decentralization.*** This is measured as the share of sub-provincial budgetary expenditure in total provincial and sub-provincial budgetary expenditure. It is calculated by summing up prefectural, county and township budgetary expenditure first, and then

dividing it by total provincial and sub-provincial budgetary expenditure in a given province (Wu and Wang 2013). Expenditure decentralization also measures sub-provincial governments' expenditure responsibilities in a province.

***H₃*: Local governments tend to rely more on land finance if they shoulder more expenditure responsibilities in a province.**

(4) ***Party secretary's tenure***. This is calculated as a provincial party secretary's accumulated time in office (in months) by the end of that year.

***H₄*: A provincial party secretary's length of time in office is positively associated with local governments' reliance on land finance.**

(5) ***Party secretary's distance to retirement***. This is measured by deducting a provincial party secretary's age from 70.

***H₅*: A provincial party secretary's distance to retirement age is positively associated with local governments' reliance on land finance.**

Other explanatory variables in the study include:

- *GDP* is the measure of economic development level (i.e. real GDP per capita), with 1990 being used as the base year.
- *Tertiary industry ratio* is a measure of industrial structure, calculated as the ratio of the output of tertiary industry to GDP.

- *Secondary industry ratio* is another measure of industrial structure, calculated as the ratio of the output of secondary industry to GDP.
- *Cultivated land* is the measure of land endowment, calculated as per capita cultivated land.
- *Population density* is measured as the number of residential population (i.e. permanent residents) per km² of land area in a given province.

Data

For this empirical analysis, we use a panel dataset from 30 provincial-level jurisdictions in China between 1999 and 2009 (Tibet is not included due to data unavailability). Though provincial governments do not directly get involved in land leasing activities to raise revenue, an analysis based on aggregated data at the provincial level sheds light on the effects of central-provincial fiscal relations, within-province fiscal arrangements, and regional political and socioeconomic factors etc. on land finance. For land conveyance fees, we use the data reported in *China Land and Resource Almanac* (*zhongguo guotu ziyuan nianjian*). Data used for other variables of our empirical analysis are taken from the *Compendium of Fiscal Statistics for All Prefectures, Cities, and Counties* (*Quanguo dishixian caizheng tongji ziliao*), the *Finance Yearbook of China* (*zhongguo caizheng nianjian*), *China Data Online*, and sources on the Internet. Table 1 sets out the definitions of the variables included in the regression models and their data sources.

[Table 1 about here]

Methodology

The following equation is used as the baseline model for our empirical analysis:

$$Y_{it} = \alpha + \beta X_{it} + \lambda_i + u_{it} \quad (1)$$

where Y is the dependent variable. X contains a set of explanatory variables, and λ denotes individual-specific effects, with the subscripts i and t indicating each province and each year. u is the random error term.

We run both fixed effects models and random effects models for the panel data analysis, and report the results of province-specific fixed effects models in Table 3.⁵ The selection of fixed effects model over random effects model is based on the result from the Hausman test that indicates that a fixed effects model is preferred. However, in our model, there may be a two-way causal relationship between the variable measuring economic development (i.e. real GDP per capita) and our dependent variable-land finance. Thus, we resort to the instrumental variable approach by adopting two-stage least square estimation (2SLS). We test different instruments for the variable of real GDP per capita. The combination of the one-year lag of GDP and the two-year and three-year lags of per capita power of agricultural machinery⁶ is found to be the strongest group of instruments based on a weak instrument test (Stock and Yogo 2002). All variables in the models are log-transformed, and their coefficient estimates can be understood as elasticities.⁷

Empirical Results and Discussion

Descriptive statistics of the variables in our models are shown in Table 2. The

first two columns of Table 3 present empirical results obtained from a province-fixed effects model and a province-fixed effects 2SLS model, respectively. The last column shows the results from a 2SLS model with two-way (both province- and year-) fixed effects. We discuss the major findings from the two 2SLS models for our analysis since it controls for the potential endogeneity of the variable-real GDP per capita.

[Tables 2 and 3 about here]

Starting from the second column of Table 3, the coefficient on transfer dependency is positive and statistically significant at the 1% level. This result confirms our hypothesis H_1 that the greater the transfer dependency in a province, the more reliance of local governments in that province on land finance. After the 1994 tax-sharing system reform, the central government recentralized much of the revenues, but left the expenditure responsibilities almost unchanged (Wong 2000). Thus, sub-national governments came under increased fiscal pressure to meet the expenditure mandates required by the central government (e.g. infrastructure construction, basic education, and health care). Even though central transfers can relieve the fiscal pressure to some extent, local governments still have to turn to extra-budgetary funds, such as land conveyance fees, to make up for the revenue shortfall.

The coefficient on revenue decentralization is negative and statistically significant at the 1% level. It confirms our hypothesis H_2 that a smaller share of a province's budgetary revenue available to the sub-provincial governments is associated with greater reliance of sub-provincial governments on land finance.

Our hypothesis H_3 , however, is not confirmed; the coefficient on the variable of expenditure decentralization is not statistically significant at the 10% level.⁸ This suggests that revenue decentralization plays a more significant role than expenditure decentralization in sub-provincial governments' decisions on land finance.

Both hypotheses concerning the two political variables, H_4 and H_5 , are supported by our empirical results. The provincial party secretary's time in office and the distance to retirement age are both positively associated with the reliance on land finance and statistically significant at the 5% level. It suggests, first, the longer a party secretary stays in office in a jurisdiction, the more likely he is to raise revenue from land leasing; second, as a provincial party secretary approaches retirement age, he may have less incentive to promote economic development by drawing on land finance.

Turning to the other control variables in the model, our findings suggest that: 1) prosperous provinces (with high GDP per capita) are more likely to draw on the land market to gain land conveyance fee, *ceteris paribus*; 2) with greater per capita cultivated land, a local government can expropriate more land to lease out for extra budgetary revenue; and 3) higher population density leads to a higher demand for urban infrastructure and other public services, which may encourage local governments to rely more on land finance.

To test the robustness of our empirical results, we include two-way (both province- and year-) fixed effects in our 2SLS model. Most of the year dummies are

statistically significant, implying that the reliance of local fiscal system on land finance is strongly influenced by national economic conditions and central authorities' policies over land and housing market. The two key independent variables in our research, i.e. transfer dependency and within-province revenue decentralization, are still statistically significant at the 5% and 1% level, respectively, with no change in the sign of the coefficients. Political variables, however, lose their statistical significance. This may be due to the fact that provincial party secretaries do not have a direct influence on local land finance decisions in lower level jurisdictions within the province.

Conclusions and Implications

Land finance has become a prominent revenue source for local governments in China in recent years. Using land finance to fund capital projects relieves the pressure on local governments to tap credit markets for financing, potentially reducing their overall risk profile (Peterson and Kaganova 2010). But it has also caused substantial public concerns because of many problems, including the instability and non-sustainability of land leasing revenue, encroachment on farmland, inter-generational inequity, the dangers of possible housing bubbles, corruption, inadequate consultation and compensation and associated community unrest. Untangling the determinants of land finance by using a provincial-level panel dataset from 1999 to 2009, this research finds that, fiscally, the large budgetary mismatch between revenue and expenditure for a province, and the weak budgetary fiscal

capacity of local governments contributes to the rise in dependence on land finance.

Politically, a provincial party secretary's time in office and the distance to retirement may also be positively associated with the reliance on land finance, though this suggestion requires further investigation.

The implications are mainly twofold. First, intellectually, this research makes a contribution to the public finance literature by untangling the determinants of land finance arrangements in China. It corroborates and provides further explanation of the findings in the existing literature, suggesting that reliance on extra-budgetary funds in developing countries is associated with various 'market' and budgetary failures, some arising from political economy factors (Allen and Radev 2006).

Second, the research findings may have implications for policies addressing the problems of overreliance on land finance. We believe they lend support to much-needed fiscal reforms to address the mismatch in the revenue capacity and expenditure responsibilities amongst the central, provincial, and sub-provincial governments (Wong and Bird 2008). The heavy reliance on central transfers by subnational governments needs to be addressed. One option to reduce the reliance is to shrink the central government's share of shared-taxes (e.g. value-added tax and corporate profit tax), while the other option is to let local governments have exclusive access to a more sustainable revenue source, such as property taxes. Our findings are also consistent with other research (Ye 2004; Wu and Wang 2013) that found that provincial governments, being between the center and sub-provincial governments, can easily grab funds intended for sub-national governments to meet their own

interests. As a result, sub-provincial administrations often bear the brunt of fiscal pressure, while provincial accounts are maintained at a healthy level (Yep 2004). More effective mechanisms are needed to constrain the capacity of provincial governments to grab revenues intended for more local governments, including greater transparency about fiscal transfers. Last but not least, the combination of a GDP-driven political emphasis and the top-down personnel management system might be contributing to local officials' myopic behaviour over leasing land in order to enhance their own political prospects. For this reason, more effective monitoring and long-term planning over land development and the establishment of a more democratic system that holds public officials accountable to local citizens in China are needed. To limit excessive land leasing by local entrepreneurial officials, integrating land finance into the formal budgetary framework is a must-do for future budgetary reform in China.

Table 1. Definition and Data Source of the Variables

Variable	Definition	Data Source
<i>Reliance on land finance</i>	The ratio of land conveyance fee divided by total sub-provincial budgetary revenue	<i>China Land and Resource Almanac (1999-2009); China Data Online (1999-2009)</i>
<i>Transfer dependency</i>	% of total budgetary spending in a province funded by intergovernmental transfer	<i>Finance Yearbook of China (1999-2009)</i>
<i>Revenue decentralization</i>	Revenue share of sub-provincial governments in a province	<i>Compendium of Fiscal Statistics for All Prefectures, Cities, and Counties (1999-2009)</i>
<i>Expenditure decentralization</i>	Expenditure share of sub-provincial governments in a province	<i>Same as above</i>
<i>Party secretary's tenure</i>	A provincial party secretary's accumulated time in office (in months) by the end of that year	<i>Online sources⁹</i>
<i>Party secretary's distance to retirement</i>	70 minus a provincial party secretary's age	<i>Same as above</i>
<i>GDP</i>	Real GDP per capita	<i>China Data Online (1996-2009)</i>
<i>Tertiary industry ratio</i>	% of Tertiary Industry Output in GDP	<i>China Data Online (1999-2009)</i>
<i>Secondary industry ratio</i>	% of Secondary Industry Output in GDP	<i>Same as above</i>
<i>Cultivated land</i>	Per capita cultivated land	<i>Same as above</i>
<i>Population density</i>	the number of residential population per km ² of land area	<i>Same as above</i>

Table 2. Descriptive Statistics (1999-2009)

Variable	Mean	Std. Dev.	Min	Max
<i>Reliance on land finance</i>	43.94	39.06	0.39	318.92
<i>Transfer dependency</i>	51.92	16.79	14.06	93.01
<i>Revenue decentralization</i>	75.59	11.94	41.99	94.49
<i>Expenditure decentralization</i>	71.06	10.44	46.25	89.23
<i>Party secretary's tenure</i>	32.02	23.86	2.00	132.00
<i>Party secretary's distance to retirement</i>	10.46	4.03	2.00	23.25
<i>GDP</i>	7749.11	5572.79	1490.35	34895.55
<i>Tertiary industry ratio</i>	38.92	6.4	28.63	75.53
<i>Secondary industry ratio</i>	45.83	7.74	19.76	62.42
<i>Cultivated land</i>	0.11	0.08	0.01	0.35
<i>Population density</i>	386.62	484.57	7.08	3023.62

Notes: The total number of observation is 330.

Table 3. Regression Results for Chinese Local Governments' Reliance on Land Finance (1999-2009)

Explanatory Variable	Models		
	Fixed Effects	FE-2SLS	TWFE-2SLS
<i>Transfer dependency</i>	1.22*** (3.79)	1.22*** (3.78)	0.49** (1.97)
<i>Revenue decentralization</i>	-3.75*** (-4.96)	-3.84*** (-5.01)	-1.37*** (-2.68)
<i>Expenditure decentralization</i>	-0.63 (-0.71)	-0.51 (-0.57)	-1.16 (-1.61)
<i>Party secretary's tenure</i>	0.13** (2.56)	0.13*** (2.60)	0.04 (0.96)
<i>Party secretary's distance to retirement</i>	0.28** (2.22)	0.28** (2.24)	0.09 (0.91)
<i>GDP</i>	1.86*** (9.65)	1.80*** (9.00)	0.11 (0.14)
<i>Tertiary industry ratio</i>	0.48 (0.83)	0.51 (0.88)	0.27 (0.56)
<i>Secondary industry ratio</i>	-0.13 (-0.22)	-0.04 (-0.07)	0.46 (0.82)
<i>Cultivated land</i>	2.55*** (3.35)	2.49*** (3.30)	0.38 (0.57)
<i>Population density</i>	5.10*** (3.30)	5.13*** (3.32)	-1.83 (-1.14)
<i>Year-fixed effects</i>	<i>No</i>	<i>No</i>	<i>Yes</i>
<i>Number of observations</i>	330	330	330
<i>R-squared</i>	0.65	0.65	0.81
<i>Hansen J Test (P-value)</i>		0.14	0.81

Notes: All variables are expressed in natural logs. In the FE-2SLS and TWFE-2SLS models, the GDP variable is treated as endogenous. Statistical significance levels: *10%, **5%, ***1%. t-statistics (in parentheses) are based on robust heteroskedasticity and autocorrelation consistent standard errors.

References

- Allen, R., and D. Radev. 2006. 'Managing and Controlling Extrabudgetary Funds.' *OECD Journal on Budgeting* 6(4):7-37.
- Alt, J. E., and R.C. Lowry. 1994. "Divided Government, Fiscal Institutions, and Budget Deficits: Evidence from The States." *American Political Science Review* 88(4), 811-828.
- Avellaneda, C. N. 2009. 'Mayoral Quality and Local Public Finance.' *Public Administration Review* 69(3): 469-486.
- Bastida, F., B. Benito and M. D. Guillamón. 2009. "An Empirical Assessment of the Municipal Financial Situation in Spain." *International Public Management Journal* 12(4), 484-499
- Bennett, J. T. 2003. 'Underground Government: The Off-Budget Public Sector.' *The Encyclopedia of Public Choice*: 914-916.
- Bennett, J. T., and T.J. DiLorenzo. 1982. 'Off-budget Activities of Local Government: The Bane of the Tax Revolt.' *Public Choice* 39(3): 333-342.
- Bohn, H., and R.P. Inman. 1996. 'Balanced-budget rules and public deficits: evidence from the US states.' *Carnegie-Rochester Conference Series on Public Policy* 45:13-76.
- Cao, C., and Z. Zhao. 2011. *Funding China's Urban Infrastructure: Revenue Structure and Financing Approaches*. Center for Transportation Studies, University of Minnesota.
- Cao, G., C. Feng, and R. Tao. 2008. 'Local 'Land Finance' in China's Urban Expansion: Challenges and Solutions.' *China and World Economy* 16(2):19-30.
- Chan, H. S. 2004. 'Research Report: Cadre Personnel Management in China: The Nomenclature System, 1990–1998.' *China Quarterly* 179: 703-734.
- Chen, Y., H. Li, and L. Zhou. 2005. 'Relative Performance Evaluation and the Turnover of Provincial Leaders in China.' *Economics Letters* 88: 421-425.
- Guo, G. 2009. 'China's Local Political Budget Cycles.' *American Journal of Political Science* 53(3): 621-632.
- Guo, X. 1997. 'Land Expropriation and Rural Conflicts in China.' *The China Quarterly* 166: 422-439.
- Kraan, D. J. 2004. 'Off-budget and Tax Expenditures.' *OECD Journal on Budgeting* 4(1): 121-142.
- Li, H., and L. Zhou. 2005. 'Political Turnover and Economic Performance: The Incentive Role of Personnel Control in China.' *Journal of Public Economics* 89: 1743-1762.
- Li, L. 2003. 'Economic Reform in the Urban Land System in China.' *Journal of Contemporary China* 12(34): 207-224.
- Lichtenberg, E., and C. Ding. 2008. 'Assessing farmland protection policy in China.' *Land Use Policy* 25(1): 59-68.
- Lin, G. C. S., and S. P. S. Ho. 2005. 'The State, Land System, and Land Development Processes in Contemporary China.' *Annals of the Association of American*

- Geographers* 95(2): 411-436.
- Liu, J., J. Wu. and L. Ma. 2012. 'Local Government Official Promotion and Land Finance' *Public Management Journal* 2: 11-23 (in Chinese).
- Marlow, M. L., and D. Joulfaian. 1989. 'The Determinants of Off-budget Activity of State and Local Governments.' *Public Choice* 63(2): 113-123.
- Merrifield, J. 1994. 'Factors that Influence the Level of Underground Government.' *Public Finance Review* 22(4): 462-482.
- Newey, W. K., and K. D. West. 1987. 'A Simple, Positive Semi-definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix.' *Econometrica: Journal of the Econometric Society* 55(3): 703-708.
- Nitikin, D., C. Shen, Q. Wang and H. Zou. 2012. 'Land Taxation in China: Assessment of Prospects for Politically and Economically Sustainable Reform.' *Annals of Economics and Finance* 13(2): 497-536.
- Peterson, G. E. 2006. 'Land leasing and land sale as an infrastructure-financing option' (Report No. 4043). *World Bank Policy Research Working Paper*.
- Peterson, G. E. 2009. *Unlocking Land Values to Finance Urban Infrastructure*. Washington, DC: The World Bank.
- Potter, B. H., and J. Diamond. 1999. *Guidelines for public expenditure management*. International Monetary Fund.
- Stock, J.H., and M. Yogo. 2002. 'Testing for Weak Instruments in Linear IV Regression.' in D.W. K. Andrews and J.H. Stock (eds), *Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg*. Cambridge, UK: Cambridge University Press.
- Van Houten, P. 2009. 'Multi-Level Relations in Political Parties A Delegation Approach.' *Party Politics* 15(2): 137-156.
- Wong, C. P. W. 2000. 'Central-local Relations Revisited: The 1994 Tax-sharing Reform and Public Expenditure Management in China.' *China Perspectives* 31: 52-72.
- Wong, C. P. W. and R.M. Bird. 2008. 'China's Fiscal System: A Work in Progress.' in L. Brandt and T. G. Rawski (eds), *China's Great Economic Transformation*. New York: Cambridge University Press.
- Wu, A.M. and W. Wang. 2013. 'Determinants of Expenditure Decentralization: Evidence from China.' *World Development* 46: 176-184.
- Yeh, A. G. O., and F. Wu. 1996. 'The New Land Development Process and Urban Development in Chinese Cities.' *International Journal of Urban and Regional Research* 20(2): 330-353.
- Yep, R. 2004. 'Can 'tax-for-fee' reform reduce rural tension in China? The process, progress and limitations.' *The China Quarterly* 177(5): 42-70.
- Yep, R., and C. Fong. 2009. 'Land Conflicts, Rural Finance and Capacity of the Chinese State.' *Public Administration and Development* 29(1): 69-78.
- Zhu, J. 2005. 'A Transitional Institution for the Emerging Land Market in Urban China.' *Urban Studies* 42(8): 1369-1390.

Notes

¹ According to Wong and Bird (2008), EBFs, broadly defined, constitute “all resources managed directly or indirectly by administrative branches of the government outside the normal budgetary process” (p.443).

² Some works treat “land finance” as an umbrella concept, including land-related taxes, land leasing revenues and land-as-collateral borrowings. But to distinguish land finance from formal budgetary public finance, we limit the discussion of land finance to the most important category of local non-budgetary funds, i.e. land conveyance fee. Also, we distinguish land finance from land-as-collateral borrowings, which are local debt indeed.

³ See http://www.china.com.cn/policy/txt/2006-12/26/content_7557491.htm for the *Notice of the General Office of the State Council on Regulating the Management of Revenues from and Expenses for the Assignment of the Right to Use State-owned Land* issued by the Chinese central government in 2006.

⁴ In this research, without special notation, local governments in China refer to sub-provincial governments, including cities, counties, and townships.

⁵ We also estimate a model with year-fixed effects included as a robustness check of our analysis.

⁶ As an indicator of agricultural modernization, per capita power of agricultural machinery meets two requirements for an instrumental variable: First, it must be correlated with the endogenous independent variable (GDP); and second, it cannot be related with the error term in the explanatory equation.

⁷ We also use the Newey-West estimation procedure to deal with the problem of autocorrelation and heteroskedasticity (Newey and West 1997).

⁸ The Pearson’s correlation coefficient (r) between revenue decentralization and expenditure decentralization is 0.61, which does not appear to indicate a potential problem of multicollinearity in our regression analysis. The results are essentially the same when we run models with either one of the two variables included in the model.

⁹ The data are collected from <http://baike.baidu.com/> (a Chinese website) and <http://zh.wikipedia.org/wiki/Wikipedia> (an English website).